

**UNIVERSITY OF GONDAR
COLLEGE OF MEDICINE AND HEALTH SCIENCE
INSTITUTE OF PUBLIC HEALTH**

**REDUCING WAITING TIME TO SEE PHYSICIAN AT ANTENATAL
CARE CLINIC OF UNIVERSITY OF GONDAR COMPREHENSIVE
SPECIALIZED HOSPITAL NORTH WEST, ETHIOPIA**

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Approved by the Examining Board

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1. Professor Yigzaw kebede

2. _____

Examiner

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LIST OF ACRONYMS

MCH	Maternal and child health
UOGCSH	University of Gondar comprehensive specialized hospital
ANC	Antenatal care
EDHS	Ethiopia demography and health survey.
MTCWT	Mean Total Clinic Waiting Time
OPD	Out Patient Department
LTAT	Laboratory Turnaround Time
MRC	Medical Record Card
PHCU	Primary health care unit

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ABSTRACT

Introduction: Long waiting time is one of the major problems that impede quality of services at University of Gondar comprehensive specialized hospital antenatal care clinic. As a result it had been an influence on quality and efficiency of service provision. Hence; implementation of an intervention to Reduce waiting time, was important.

Objective: The objective of this study was reducing Total waiting time to see physician at antenatal care clinic of University of Gondar comprehensive specialized hospital.

Methods: A hospital based waiting time measurement before and after the introduction of specific scheduling system was conducted; selected pregnant mother at ANC Clinic were Participated. Data was collected by research assistants at different segment of a client flow, starting from the registration room until entering the outpatient examination room. Tests of significance between the pre and post intervention phases of the project were performed by using independent sample *t*-test by using Excel Spreadsheet 2007 to determine whether the selected intervention significantly decreased patient waiting time to see physician.

Ethical Considerations The research proposal was reviewed by the Institutional Review Board (IRB) committee of university of Gondar.

Results: After implementing specific scheduling system, data from the post-intervention analysis showed a reduction in median wait time to see physician from 286 minutes in the pre-intervention study to 248 minutes in the post intervention study. This demonstrated waiting time reduction by 13.3%. (P value = 0.0026).

Conclusions: The main factors leading to long wait time were identified and Waiting time monitoring instrument as well as clinical observations indicated improvements in client waiting time but it needs for several measures, namely: More examination rooms, fully functional maternity side laboratory service and recruitment of general practitioners with strengthening of University of Gondar hospital service integration with other district hospitals and health centers.

1 BACK GROUND

1.1 Organization description

University of Gondar is one of the largest and most distinguished higher educational institutions in Ethiopia, Located in the heart of the historic Gondar City, found at 727 kilometers away from Addis Ababa. After many transformations, in 2004 became the University of Gondar.

Currently the University is made up of the College of Medicine and Health Sciences (CMHS) 5 Faculties and 3 Schools. University of Gondar comprehensive specialized hospital is Under GCMS.

The mission of this hospital is to reduce morbidity, mortality and mental disability through provision of quality, curative and rehabilitative health service as well as capacity building through training and research.

Outpatient, Inpatient, maternal, neonatal and child health, Emergency and hygiene & Sanitation services are the main services, which is provided with in 14 out patent departments and 20 wards. There are 550 beds. Currently the catchment population according to the UGCSH health information statistics center is more than 7 million in the surrounding area of Gondar town and the nearby Woreda and zone.

40 senior and 61 general practitioner physicians, 562 nurses and other health professionals, 397 non clinical staffs, 53 midwives, 53 laboratory professionals are working currently. Among these currently the ANC clinic have 4 midwives, 4 interns, 1 porter and 1 cleaner, 1 matron (1)

1.2 Statement of the problem

The Ethiopia health sector transformation plan for the 2015/16-2019/20 target is to reduce MMR from 420 to 199/ 100,000 Live Birth and one of the performances measure for this plan is Increase at least four visits of Antenatal Care from 32% to 95%. (1).

The Min-EDHS 2016 reported that the ANC follow up with at least one visit and four plus visits were at 62% and 32 %, respectively. (1) UGCSH Total ANC achievement in 2008 budget year was 9907. Among these 5170 mothers were 1st visitors & 4737 women's are reached 4th visit Plus .

Among the 124 standards contained in the Ethiopian Hospital Reform Implementation Guidelines (EHRIG), 8 are on quality management and improvement. (2) Among these

Outpatient Waiting Time to Treatment is one of the indicators used to evaluate the outpatient clinic performance; so that ANC clinic is one of the Outpatient departments and health care provided for pregnant mother is one of MMR reduction indicator.

Services provided in the ANC clinic comprises history taking, general assessment on status of pregnancy, including screening tests and identification of conditions detrimental to health during pregnancy. (3) The quality of antenatal care (ANC) can be measured by qualifications of the provider and the number ,frequency of ANC visits, the content of services received and the kinds of information given to women during their visits.(4, 5) Good ANC links the woman and her family with the formal health system; however Inadequate care during this time breaks a critical link in the continuum of care, and effects both women and babies.(6)

Patient waiting times can serve as indications of problems within an existing system of how a clinic or hospital functions .Long waiting time to see physician (i.e. the time spent from arrival at the hospital MRD until to see the physician) is one of the factors that dissatisfy clients, because it is detrimental to the mother and life of the baby and also can be a cause of stress for both patient and doctors, it is also considered as a tangible aspect of practice that patients will use to judge health personnel, even more than their knowledge and skill(7, 8). The Institute of Medicine (IOM) it is an American nonprofit nongovernmental organization, provides national advice on issues relating to biomedical science, medicine, and health, and serves as an adviser to the nation to improve health. Because of this it recognized the problems of prolonged waiting time resulting in dissatisfaction among patients and had therefore recommended that at least 90% of patients should be attended to within 30 min of their scheduled appointment time (9).

However in developing countries, as several studies have shown patients spent long waiting time. A study conducted in General out-patient Department Mulago Hospital Uganda shows Most of the staff identified the pharmacy, triage, laboratory and X-ray as the sections that delay most of the patients. (10)

A study conducted in Nigeria Patient waiting time in outpatient clinics is often the major reason for patients' complaints, similarly In the 2009 study, regarding their experiences in outpatient clinics showed waiting time had the highest proportion of dissatisfied patients [30%]. (11-13) In Ethiopia studies in different hospitals shows the waiting time especially in outpatient department is long .Studies at Jimma University specialized hospital in 2001has indicated an

average of 4.5 hours' waiting time. and Similar findings also in Gondar university teaching and referral hospital ART OPD and Amanuel Mental Specialized Hospital showed the median overall waiting service time of 274.8 hours and 112 minute respectively.(14, 15). It is also in line with a study conducted in Hawassa University Teaching Hospital 37.4% and 26.3% respondents were complained by saying long and very long waiting time respectively .(16) .

Studies in Jimma hospital, Gondar referral and teaching hospital and the hospitals of the Amhara regions shows one of the reason for low client satisfaction was long waiting time.(17). In a study of yekatit 12 hospital medical college a patient relatives on services provided by the laboratory, x-rays and pharmacy, commented “ we use to encounter problems with retrieving laboratory results, it takes too long and some results are missing even after taking several samples.(18) Generally Several studies have identified prolonged waiting times as the main components of patient dissatisfaction, as well as the most frequent reason patients leave before medical evaluation

Being the outpatient clinic is the first point of contact with a patient to health care service and ANC clinic is one of the OPDs found in University of Gondar comprehensive specialized hospital and considered as one of key performance indicator of the general quality of services of the hospital and it is reflected by the patient satisfaction with time spent.

In fact it is obvious to observe ANC service visiting mothers overcrowding and waiting too long at the MCH Department waiting area. In addition to this simple observation revealed congestion of the department. Particularly with new clients

The reason behind this is, Despite of UOGCSH is a referral hospital with several referral cases requiring specialty services, several clients from district and Gondar town prefer to get ANC services in this hospital. According to the ANC Clinic staffs said and an observation by the investigator revealed majority of clients come from any health center without visiting the nearby health institution because clients assumed similar services are not available in the nearby health center.

In the ANC clinic it was a norm to appoint all clients to see physicians in the afternoon but because of high load of clients who are waiting more than A day or 2 days, the same day service for all new clients was not practical before This study. In addition to this, there was no a system

informing clients to the specific examination time by considering availability of Lab & previous day reserved clients to reduce Idle time of a client .

In my knowledge There is no similar studies on the area of the problem .Therefore, this study can be an effective means of determining the waiting time starting from registration until to see the physician, Identifying the root causes of long waiting times and enables to establish and implementing the best intervention, as a result ANC service utilization rate and quality of service will be increased for subsequent visits.

By using problem ranking matrix different problems were listed such as high laboratory reagent stock out rate, Poor HMIS reporting and documentation practice, poor waste segregation system and long ANC client waiting time were the major problems in Gondar university comprehensive specialized hospital and among those problems based on its impact, frequency, and feasibility **long waiting time** was selected as below.

Table 1 Problem ranking matrix in UOGCSH

Problems	Criteria				Total Score
	5=MOST IDEAL		1=LEAST IDEAL		
	Time	Impact	Cost	Feasibility	
Long ANC Client Waiting Time	5	3	3	3	14
Poor Waste Segregation System	4	2	3	3	12
Rate Of Laboratory Reagent Stock Out	3	4	3	2	12
HMIS Reporting &Documentation Practice	4	3	3	2	12

After the problem selected then it was approved by the hospital management team and the root causes were identified and appropriate interventions were selected.

The selected intervention was scheduling system which means appointing New and revisiting ANC visitors for the next visit to come early in the morning, there for services by the physician in the morning will provided only for Re-visitors and high risk mothers.

Beside to this For new client's, After providing screening and laboratory services in the morning and by creating a mechanism most laboratory results could be available before 2:00 pm to be examined by the physician in the afternoon based on the availability of laboratory results and client load.

2 ROOT CAUSE ANALYSIS

2.1management tools used to find the root causes of the problem

- Assessments of Amhara Hospital Performance Monitoring and Improvement Manual
- Discussion with senior management team, triage workers and card room workers.
- Observation of all the process starting from triage until to see doctors.
- Collecting information from customers and facility staffs were used.

Hypothesized root causes of client flows from arrival at registration or ANC clinic until to see physicians were listed below. All root causes were investigated in detail by collecting relevant data and discussing with case team leaders, coordinators and concerned staff members of the hospital

- I. Examination starting time is too late.
- II. Long service and waiting time to get laboratory result
- III. Both new and revisits clients come at one time both in the morning and afternoon.
- IV. There is no priority for ANC visiting mothers in a long queue at all station.
- V. High client load at ANC clinic.
- VI. Lack of extra room for ANC screening
- VII. Poor (incomplete) referral system.
- VIII. Lack of laboratory centrifuge machine.
- IX. Shortage of lab technicians and GP

Based on this, Root causes of the problems throughout the client flow were grouped into four different perspectives which includes environment, supplies, people and policies

1. ENVIROMENT

Poor waiting area arrangement

To far ANC laboratory room

Lack of extra room for screening, laboratory sample collection

2. SUPPLY

Lack of ANC clinic side lab centrifuge machine.

3. POLICY

Long service and waiting time to get laboratory result.

Even though all screened ANC clients are sent for routine laboratory services at any time, the laboratory results were not available at the same day because of high client load and different arrival time of clients at the laboratory room. Beside to this to avoid incomplete and missed of laboratory results There was no guiding rule and regulation that limits the number of clients presented to ANC clinic room at a time, also , there was no formal referral system between

UOGCSH and neighboring health institutions particularly on ANC service. As a result of this all clients arrived at hospital they will be registered and transferred to ANC clinic all over the day it was a reason for congestion of the ANC clinic waiting and service area. Because the client load and the service provider capacity in number of professional and service room were not proportional.

At the end of the day about 4:30 pm majority of clients were told to come for the next day, this lengthens ANC clients waiting time from hours up to 3 days.

Lack of priority for Pregnant at long queue

Despite pregnancy is caring the fetus and it is a burden for the mother and a key priority area for the country, there was no rules to give priority for pregnant mothers to be served first at all segment of the service area for instance at the laboratory room. .

4. PEOPLE

Many clients both new and revisits come to ANC OPD during the morning

When many clients arrive at the same time then most of these clients would have to wait a long time as a result the staff members would be busy by serving the clients who are coming first in the batch and the rest clients would be waiting too long even majority of clients appointed for the next day, on the other hand the space and hospital setup was not capable to accommodate all clients arrive at the same time, The OPD corridor is narrow (about 1 meter) to pass sufficient clients and staffs to move freely through it.. As a result of this high number of pregnant mother are serving daily. As the moment many clients and their families in attempts to shorten their long waiting time inappropriately communicated with service provider' even conflict was happened regularly. As a result of this waiting time to see an intern was very long.

The other problem was because of different reasons; patients are coming to hospital out of appointment date. All revisit ANC clients come without limited appointment date per day which will add unnecessary patient load in a single day because there is no specific scheduling system. Based on the above description the root causes with four perspectives presented as below with a fish bone diagram

Examination starting time is too late.

Since the UOGCSH is a teaching hospital usual work starting time by the physician is late because all interns who are assigning in the OPD will be participated at the morning session

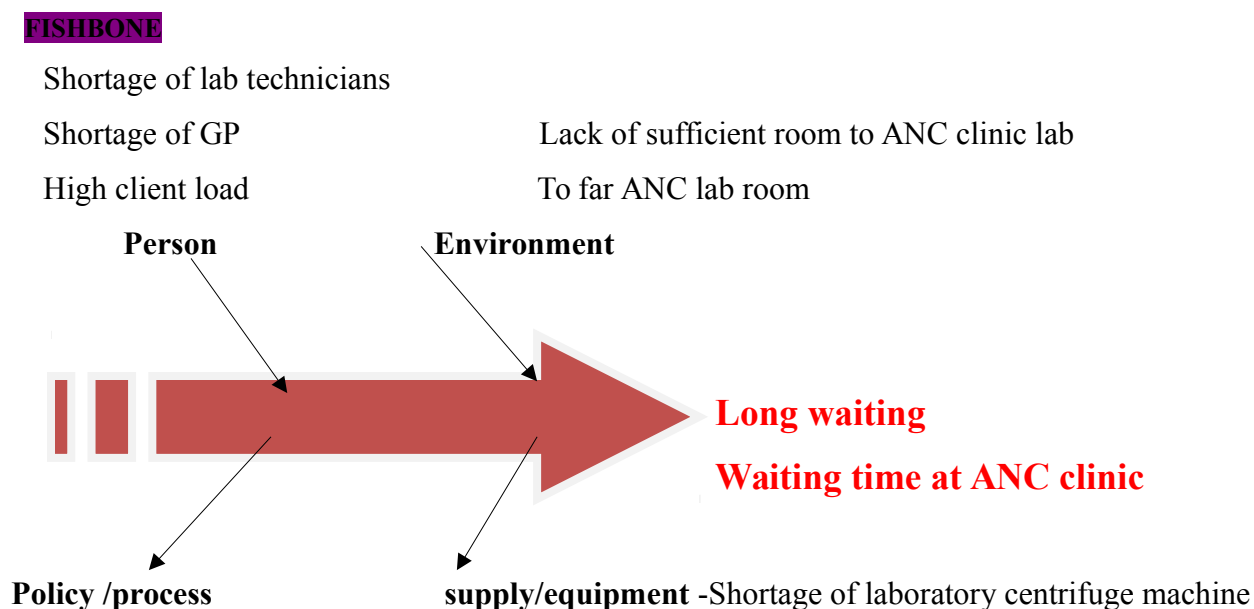
because of this work starting time is between (9:00 – 10AM) .Because of this late work starting time is one of the root causes for long ANC client waiting time .

Poor (Incomplete) Referral System

According to Ethiopia 3rd tier document Primary hospitals health expected to provide preventive, curative, inpatient and ambulatory services, and emergency surgical services, including caesarean section and blood transfusion. They also serve as referral centers for health centers and General hospitals a provide inpatient and ambulatory services. They are also referral centres for primary hospitals. The specialized hospital is serves as a referral centre for the general hospitals and provides inpatient services. But still this referral linkage is not practical

On the other hand when clients referred by health institutions majority of clients have no referral papers on their hand or it is incomplete meaning all laboratory results are not attached or Written at their referral paper Because of this even though clients coming for the specific service they will be provided all routine laboratory services as a new client which causes the client waiting time to be too long.

Furthermore,



Lack of priority for pregnancy
Poor (incomplete) referral system.
Too long laboratory turnaround time

Figure 1 Fish bone

Another management tool that helped to find the root causes of the problem were, studying the root causes of antenatal care clinic Patient flow, from arrival time until to see physicians in UOGTRH antenatal clinic is as below

ANC client's flow chart

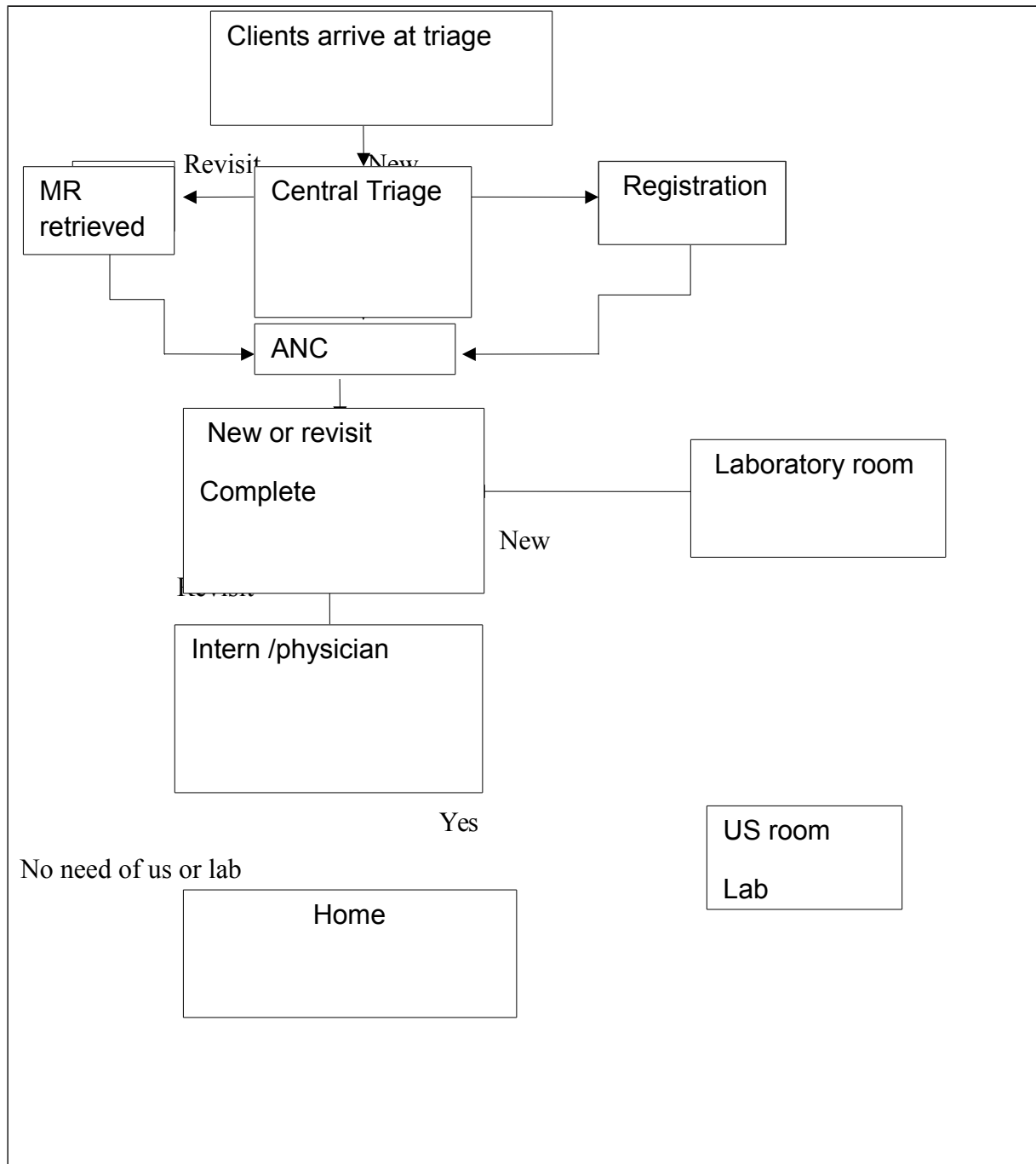


Figure 2

2.2 Root cause verification

Table 2 Evidences to accept and reject root causes at UOGCSH ANC clinic in2016

<i>Proposed root causes</i>	<i>Evidences</i>	<i>Accept /Reject</i>
Lack of priority for pregnancy	<i>Observation</i>	<i>Accepted</i>
Too long laboratory turnaround time	<i>Time motion base line survey shows 4:30 hrs</i>	<i>Accepted</i>
Lack of scheduling system	<i>Observation</i>	<i>Accepted</i>
Shortage of laboratory centrifuge machine.	<i>Interview coordinators</i>	<i>Accepted</i>
Poor referral system	<i>Majority of clients Observation clients come without referral paper.</i>	<i>Accepted</i>
Lack of sufficient room	<i>Interview /observation</i>	<i>Accepted</i>
Shortage of lab technicians	<i>Comprehensive specialized Hospital Ethiopian Standards: required professional=22 available there are sufficient staffs</i>	<i>Rejected</i>
Shortage of GPS	<i>Hospital standard</i>	<i>Accepted</i>
Delay to start work early in the morning	<i>Time motion study (base line) 9:00-10:00 AM</i>	<i>Accepted</i>
High client load	<i>On average 65 clients per day in morning and after noon</i>	<i>Accepted</i>

TABLE 3 List Of Verified Root Causes For Long Waiting Time At UOGCSH ANC Clinic

Possible causes	Frequency	Severity	Feasibility	Time	Total rank
Tool long laboratory turnaround time	5	3	3	4	15
Lack of specific scheduling system	4	4	4	4	16

Shortage of laboratory centrifuge machine	3	3	2	2	11
Delay to start work early in the morning	4	3	2	3	12

Values for ranking Most ideal =5 Least ideal =1

To determine the true root causes, information and data have been collected. The main root cause for long total waiting time in the ANC clinic was selected based on the problem ranking matrix as seen above. As a result, lack of appropriate appointment system, and long laboratory process time were selected. Which was also identified by the base line time motion study, laboratory service only accounts 4:40 minutes from the total median waiting time to see the physician.

2.3 Literature

Antenatal care includes examinations, evaluations, and interventions that have been shown to reduce both morbidity and mortality rates.(6) Pregnancy often represents the first opportunity for a woman to establish contact with the health system. However, there is a large gap between a single antenatal visit and optimum ANC, which would require follow up visits and several preventive interventions Recommended (6)

Antenatal care coverage is one of the indicators among the Ethiopia federal health sector several targets for the 2015/16-2019/20 GOAL(2) and Quality of ANC is an important determinant of pregnancy outcome and had been designated one of the four Pillars of Safe Motherhood, along with clean and safe delivery, essential obstetric care and family planning which could contribute to reduction of maternal mortality. However Poor antenatal care is considered the second most important preventable factor in maternal mortality after substandard obstetric care.(19)

Additionally Measuring coverage alone does not provide information on quality of care, and poor quality in ANC clinics, correlated with poor service utilization, it is common in Africa. (6) Even though similar study at the ANC clinic waiting time not available, A Study of Client Satisfaction with Health Services in Uganda in 2008 (Jessica et al., 2008a) Found that patients wait for a long time in the public facilities before they are attended-to for up to 180 minutes This was longer than recommended time of 60 minute.(Ministry of Health of Uganda ,2004). Sixty-one percent (59/96) respondents waited between 90 and 180 min in the clinic (from entry to exit), whereas 36.5% (35/96) waited for more than 180 min with a mean total clinic waiting time (TCWT) of 168 (35) min. (8) A recent satisfaction survey among out-patient departments in Mulago hospital found that long waiting times among patients. More than half of them waited for about 5.9 hours with the shortest time being 4hrs and longest time being 7hrs. (10)

The studies done in India and Malaysia on patient satisfaction showed that waiting time had a significant association with patient satisfaction. The main factors leading to long waiting time are identified at registration time. However the waiting time for physician consultation demonstrates long delays of more than three hours in some cases. The main reason for dissatisfaction was long waiting time to get or complete the services (10)

Similarly A recent study in Ethiopia in selected hospital of Addis Ababa shows Eighteen percent of pregnant ladies were dissatisfied with waiting time to complete ANC.(19)

In Tigray Zonal Hospitals Over one third (44.2%) of the respondents reported dissatisfaction with the overall waiting time to get the hospital services, and responses of focus group discussants reported there is delay in giving the specimens and receiving the results from the laboratory and x – ray units.(20).The lack of a time specific appointment system has been suggested as a reason for long waiting time(21).

Patient satisfaction in the provision of health service has a relation with waiting time, and long

Waiting time at different segment of the health care providing institutions are a common phenomena. In UOGCSH an intervention to reduce waiting time by implementing scheduling system was done at ART clinic had a good improvement in reducing long waiting time. Therefor in this study by implementing time specific scheduling system long waiting time at ANC clinic were planned to be reduced.

Time-specific appointments are not the usual practice in ANC clinic outpatient department of UOGCSH as the base line survey shows most patients arrive at the clinics within the same time block from 2:00 to 10:00 AM, as a result of which, physicians get so overwhelmed with the large number of patients waiting to be seen and several clients enforced to wait a long time even for number of days.

The fundamental purpose of this paper is to explore intervention and implementing them to reduce all waits in all areas of the health care system. In particular, ANC clinic waits must be addressed as an immediate priority.

If an on-site lab service are available or a priority is given for pregnant mother in dispatching a laboratory result, it will decrease laboratory turnaround time as a result of this, long waiting time reduces successfully. So that, majority of time contributed for long stay of pregnant mothers will be avoided.

The current emphasis in improving quality outpatient service delivery especially in public Health facilities requires a detailed, fundamental understanding of how hospital outpatient Departments' operate and mapping the process of care is an important step towards this goal (Barach & Johnson, 2006).⁽¹⁰⁾ Therefore, there is a need to carry out a systematic study on patient waiting time at the outpatient department, with a view of identifying factors affecting waiting time and warranted implementation of appropriate intervention to improve the quality of ANC service as a result of this. The other strategy to strengthen the selected intervention was approximation of laboratory and ANC clinic to create ease of clients to give sample without confusion and delay. Therefore by identifying the main root cause of long waiting and implementing the selected intervention which was implemented in other outpatient clinics of the hospital Long waiting time at ANC clinic will be reduced for subsequent visits.



3 OBJECTIVES

2.1 General objectives

The objective of this study was reducing total waiting times to see physician at antenatal care clinic of University of Gondar comprehensive specialized hospital, North West Ethiopia.

2.2 Specific objectives

2.2.1 To measure antenatal care clinic waiting time before and after implementation of an intervention.

2.2.2 To reduce median waiting time to see the physician after implementing scheduling system from 286 minute to 235 minute, by the end of September 2016.

2.2.3 To reduces laboratory turnaround time on the same day by 30% from the base line (261 minute) to 183 minute by the end of September 2016.

4 METHODS

4 .1 Project area \Setting

The study was conducted at University of Gondar comprehensive specialized hospital Amhara region, northwest of Ethiopia, has 550 beds and 14 outpatient clinics. The ANC clinic is under MCH department provides focused antenatal care service such as history taking and physical examination, laboratory and ultrasound service, immunization and PMTCT services.

During the base line assessment time ANC clinic had 4 interns, 4 General practitioners (GPs), 6 nurses, 1 porter, and 1 cleaner.

According to the UOGCSH Statistics Department. Total ANC visit achievement in 2008 budget year was 9907. Among those 5170 mothers were 1st visitors & 4737 women's are reached at 4th visit. On average about 825 & 37 ANC visiting mothers attended per month and daily respectively. Triage case team, card room, screening room, outpatient clinic and laboratory room were the major area of study.

4.2 Study design

A hospital-based pre-post interventional survey Design was applied on pregnant mothers attending antenatal clinic before and after the specific scheduling system is implemented.

4.3. Study population

Selected pregnant mothers who visited University of Gondar comprehensive specialized hospital for ANC service during the data collection period were the study population

4.4 Sampling Procedures.

To determine the Sample size required for waiting time to see the physician the following

Formulas were used that is $n_1 = n_2$

$$\text{Sample size} = \frac{2SD^2(Z_{\alpha/2} + Z_{\beta})^2}{d^2} \quad (22)$$

n_1 = estimated pre intervention sample size

n_2 = estimated post intervention sample size

SD = 150, from pilot study.

$Z_{\alpha/2} = 1.96$, at type 1 error of 5% ($\alpha = 0.05$),

$Z_{\beta} = 0.842$ (from z table) at 80% power

D = estimated change in median waiting time = 44 minute

When the above values were substituted into the formula, a sample size of 182 clients would be needed, but Absents, lost and incomplete cards were considered as 10% and calculated as 18, then substituted this into the formula giving a total required sample size of 200.

According to 2008 UOG hospital annual HMIS report. On Average 32 clients were visited ANC clinic per day (in the morning and the afternoon) therefore We carried out the systematic

sampling technique and Simple random sampling was done for the first two revisiting clients to get the starting point. Thereafter, every other revisiting client that came to the clinic was enrolled in the study until the required daily sample size (16) was obtained. For 6 days but at the end of the day after absents, incomplete and lost time tracing cards were discarded a total of 90 revisiting clients were obtained.

But all new clients coming for ANC follow up were included and at the end of the day absents and incomplete or lost time tracing cards were discarded and in each day 1 new client were selected by systematic random sampling for 6 days and yielding a total of 90.

Generally 180 clients were obtained during the pre intervention phase from July 25-29 2016 and, the same number of clients was obtained during the post intervention phase in December 30/2016 –January 5, 2017. Using a time tracking form (annex 6-8)

Both in the pre and post intervention phase. New and revisiting participants were equally assigned (90 news and 90 revisiting clients). Clients come after implementation of improved referral system with specific scheduling system comprised the post intervention sample size. The laboratory turnaround times taken for the routine laboratory service were collected and analyzed individually for only new visitors and In the study period (both in the pre and post intervention study) 19 absent and 23 clients, who had incomplete time tracing card were discarded during the analysis.

4.5 Study variables

4.5.1 Dependent Variable

Waiting time to see interns (physicians)

4.5.2 Independent variable

- Type of visit (New, Revisit)
- Number of staffs
- Volume of clients
- Client flow process
- Awareness of clients
- Work starting time
- Scheduling system

4.6 Operational definition

Total Waiting time to see interns: It is a continuous variable for the purposes of this study it is measured as total time from arrival at the registration department until to see interns at ANC outpatient clinic **which includes laboratory services.**

Laboratory turnaround time: the time spent for the Laboratory services.

Scheduling system: appointing new clients in the afternoon at 1:30 PM after they provide laboratory samples and for subsequent visit informing and serving revisiting mothers only in the morning shift (starting from the post intervention phase).

Section waiting time: This is time the patient spends waiting to receive a service at a specific service point within the clinic.

Service point: This refers to the various stations within the clinic where the patient receives a specific service

Service time: This is time patients spend receiving a service from the service provider at any service point.

Client flow process: Describes the clients' movement through a set of sections from the time they walk into ANC clinic to the time they are discharged by the health worker or the time they choose to leave.

Volume of clients: daily visiting clients at ANC clinic .

4.7 Inclusion and exclusion criteria

4.7.1 Inclusion All pregnant clients attending ANC service in the study period.

4.7.2 Exclusion criteria Critically ill and high risk pregnant clients were excluded.

4.8 Data collection procedures

Tools used for data collection where Wrist or mobile watch .Time tracking cards and Patient flow analysis.

4.8.1 Pre intervention phase Data Collection

The first phase of the time-flow study performed from July 22- 29/2016. It was exploratory and aimed to identify the problems and the duration of patient wait time. Study participants were clients and MCH Department staffs at university of Gondar CSH.

A. New client data collection

For this category the patient's total waiting time to see physician was defined as the time from when the patient arrived in the Medical record room for registration until to entered the OPD examination room.

The time was tracked by research assistants for each station as illustrated in the time tracking form. The first station, for those clients where registration room, Where general information and registration time was recorded by research assistants, following this, time tracing cards attached with their personal medical record file and sent to ANC clinic by the responsible porter.

At the ANC clinic assigned research assistant (assistant 2) collected time tracing cards by detaching it from the main MRC, later on when the client is calling and entered in the screening room their arrival time was recorded. Subsequently the clients were sent to the laboratory, when the time recorded as exit from screening or considered as entrance for giving laboratory sample at the laboratory room.

When clients complete screening service, after providing laboratory samples, they told to come at 1:30 PM in the afternoon for physician examination.

After all laboratory processes completed and results were available, The laboratory result paper returned back by the laboratory department porter, when, The laboratory results available time was recorded by the assigned research assistant (assistant 2) who is found in the screening room.

Finally in the afternoon all 1st visiting pregnant mothers card will be assigned and transferred in to 3 outpatient rooms, where research assistants (assistant 4,5,6) are found at the entrance, when the client is called and entered in to the examination room and the time was recorded as time seen by the physician.

B. Revisiting clients 'data collection

The patient's waiting time to see physician was defined as the time from when the patient arrived at the ANC clinic for MRC retrieval until to entered the physician examination room . The first station, for these clients where ANC clinic, where general information and arrival time was recorded by research assistant 2 .After cards retrieved the time tracing cards was attached within it. Subsequently revisiting clients were assigned according to their risk in each OPD rooms and where the time tracking forms were handled by research assistants (by assistant 4, 5, 6) then, when the client called and entered the examination room the entrance time was recorded at each room.

Watches are synchronized at the beginning of the day and at noon every day for all assigned assistants.

4.8.2 Post Intervention Study Data Collection:

The second phase of the time-flow study was performed after 5 month of the pre intervention study. This runs for 6 days from Dec 30, 2016 to January 05,2017 e c when waiting time to see the physician were attempted to decrease by 15% from the pilot study .

Like the pre intervention study the sampling size for this study was 180. Data collection tools, participant selection and sampling procedure had no significant difference.

Similar to the pre intervention phase, Variables monitored in this study were clients waiting and service time required for screening, clients waiting and service time required for laboratory service, clients waiting time required to a physician work process throughout the client flow.

4.9 Indicators

Table 4 processes and outcome indicators

Process indicator	Pre intervention period plan	Post intervention period performance
Orientation provided ANC clinic staffs about the new scheduling system.	90 %	96 %
ANC visitors took specific scheduling	90 %	96 %

appointment		
Woreda health office MCH focal person communicated	1	100 %
Zonal health department MCH focal person communicated.	1	100%
Outcome indicators		
Percentage of total median waiting time reduced to see the physician.	286 minute	(13 %)248 minute
Percentage of Laboratory turnaround time reduced	261 minute	177 minute reduced by 30%

4.9. Data Analysis and Statistical Consideration.

The pre intervention and post intervention median waiting times to see the physician were analyzed to determine whether the selected intervention significantly decreased patient waiting time by independent sample T-tests using Excel Spreadsheet 2007. Both tests used confidence level at <0.05 to determine the statistical significance. Before the analysis for all dates log transformation was used .because the data was skewed

4.10 Result dissemination

The results of the project will be disseminated to UOG hospital medical college. The result of this study will be disseminated to relevant bodies such as UOG School of Public Health, and

Gondar comprehensive Specialized Hospital (UOCSH) for intervention and all other similar hospitals that faced the same problem. And also the findings of this study will be made ready for possible publication in a reputable journal.

4.11 Data quality management

To ensure data quality the data collection instruments were piloted, half-day training on the data collection procedure, ethical issues, technique, and the use of the time motion form was given for research assistants by the principal investigator before a pre and after an intervention study plus to this, close supervision was made during the data collection process and data completeness and consistency were checked at the end of the day. Data entry errors were minimized by performing double checking Manually. Any error, ambiguity or incompleteness encountered was addressed at the end of each data collection day before starting next day activities.

4.12 ethical considerations

Permission letter for base line survey or pilot study was obtained from College of Health Sciences, and School of Public Health and university of Gondar comprehensive specialized hospital Clinical director and at the beginning of the study Ethical clearance was obtained from university of Gondar comprehensive specialized hospital, From College of Health Sciences, and School of Public Health. Verbal consent was obtained from all study participants prior to data collection

5 ALTERNATIVE INTERVENTIONS:

- Arranging side lab for MCH Department.
- Establishing specific scheduling system
- Strengthening referral system with health centers
- Increasing number of staffs GPS

Criteria used for *comparison and selection of the best intervention were*

Effectiveness (Impact): How much will it improve the problem?

Time to effect: How long will it take to work?

Feasibility: Is there capacity?

Annual Cost: How expensive is it to carry out?

Table 5 comparisons (matrix) of interventions for ANC clinic waiting time reduction

Interventions	Criteria				Total Score
	5=MOST IDEAL 1=LEAST IDEAL				
	Time	Impact	Cost	feasibility	
Arranging side lab for MCH Department.	5	3	4	3	15
Establishing specific scheduling system	4	5	4	3	16
Improving referral system with heath centers/district hospitals	3	4	3	4	16
Increasing number of staffs	4	3	3	4	14

5.1 Selected best intervention

Similar to the identification of the problem and root causes, the best intervention was selected by discussing with MCH department teams. The selected best intervention was establishing specific scheduling system. As the team developed the implementation strategy and decided to establish a scheduling system by improving referral system and LTAT.

Starting from September 9, 2016 all ANC visiting clients were given a specific schedule, which means for subsequent visit, informing the client to come in early the morning shift only. On the other hand New clients after providing laboratory samples to be seen by the physician their appointment time were according to expected LTAT and living residence they come from, this helped clients from wastage of idle waiting time. Clients who came out of Gondar town had a priority to be served first.

ANC services are one of the OPD services provided in the country from starting from primary health care units to tertiary level. Beside to these routine services are uniform for majority of pregnant who attend for follow up and standardized guidelines are available at every health institutions. These services also could be provided by nurses, midwives, health officers at the periphery level and by Medical doctors and midwives at the higher level. Despite of this there are a few services which are available only in the higher level such as Ultra sound, blood transfusions, and services for high risk pregnant. Due to this reason visiting Specialized hospital like UOGCSH may be mandatory.

However the reason of high Client flow for this hospital was not only the specific services, Majority of clients have no Awareness about the availability of similar services either routine services or professionals at the primary health care unit level.

To alleviate this problem participating the surrounding health institutions (North Gondar health department, Gondar town health centers and Gondar town health office) Maternal and child health responsible persons were one of the strategies used especially to Improve referral system. Therefore, after communicating with the UOGCSH Nursing Core Processor and Hospital Administrator, focal Person was assigned and the investigator with her communicated with health centers, responsible bodies of zonal health department and town health office.

The drawback and mechanisms to reduce long waiting time was raised and there was an agreement such as, retaining of catchment ANC clients in the nearby health facility, awareness creations and Improvement of ANC client's referral system (sending with full investigation results).

Because of this it avoids redundancy of routine laboratory investigations and brings subsequent reduction of waiting time.

Information provided for clients as health education were another intervention implemented in the study area, which comprises health education about benefits of adhering the specific appointment date, availability of routine laboratory services in the nearby primary health care units, benefits of bringing complete referral paper from nearby health institution. Beside to this for the physicians about the appointment session and for clients about the above health education topics reminding notice paper at the entrance and excite of ANC clinic door was posted.

As a result of this since the routine lab tests are mandatory for all new clients, clients who come with complete laboratory results had got a chance to see the physician immediately by passing the routine laboratory service processes .As a result of this waiting time for these clients become reduced relatively with others come with incomplete or without laboratory results attached with their referral sheet.

Furthermore, to support the selected intervention, outpatient appointment system template was developed. The protocol includes the objective of the planned activity, how appointment was given and for what type of patients should it be given. This paper was communicated to most staff that have been working in OPD and posted in the 4 rooms of the OPDs.

In addition to this to reduce LTAT a sort of Discussion was held with laboratory department head, laboratory technologists and laboratory porter .so that a mechanism to Do and Dispatch ANC results before 2 PM was created. Number of laboratory results missed becomes reduced after the intervention this is revealed by MCH departments midwives.

6 MONITORING OF THE SELECTED INTERVENTION

In order to monitor the implantation of the intervention, three monthly supportive supervisions were done using checklists by the principal investigator .The progress of the project was communicated with the MCH team of the hospital and Laboratory department head , feed backs were used to reduce the level of long waiting time and enhance the quality of service.

7 Evaluation plan

Table 6 Evaluation plan after intervention is implemented in the ANC clinic

Indicator	Definition	Who	Where to get info	When
Percentage of staffs working in the ANC clinic oriented	Orient all staffs on new ANC clinic scheduling system	Department head with investigator	MCH department	After discussion with the hospital senior management
Percentage clients took specific scheduling date	All new visitors expected to take specific scheduling date.	Assigned staff in the MCH Clinic	Re visit appointment card in MCH departments	After orientation of staffs
Percentage of waiting time reduced	When pre intervention Waiting time is reduced after specific scheduling system is established	Mgt team With investigator	Waiting time study	After 3 months of intervention implemented
Zonal and Woreda ANC responsible persons communicated	With UOGCSH focal person communicating MCH officers about ANC service referral system	Investigator with UOGCSH focal person	Town and zonal office /Department	Before implementation of the intervention

NB .the first intervention of the specific scheduling system were modified after monitoring and evaluation of the client flow process after 1 month of implementation later on, the specific scheduling system was again used after modification of the first model .

8 RESULTS

8.1 Socio and Demographic Characteristics of the clients

Both pre intervention and post intervention samples had 180 clients each. Samples did not have significant difference by visit type, and type of services received.

One hundred fifty five 155 (80 %) of ANC pregnant hailed from within Gondar town with thirty five 35 (20%) percent coming from the neighboring woredas of Gondar town in the pre intervention phase, while in the post intervention phase 135 (75 %) hailed from Gondar town and 45 (25 %) come in the neighboring woredas of Gondar town (Table5).

Table 5: ANC clients sample characteristics in Pre intervention and post intervention phase of waiting time study at UOGCSH ANC clinic 2016

Sample size N=180	Pre intervention N%	Post intervention N %
Type of visit		
New	90 (50%)	90 (50%)
Revisit	90 (50%)	90(50%)
Total	180(100%)	180(100%)
Participant age		
15-24	80 (44.4%)	59(32.6%)
25-34	92 (51.1%)	104(57.5%)
35+	8(4.1%)	17(9.4%)
mean age with SD	26.1+ 3.7	26.6 -+ 4.7
Median age	26	26
Place of residence N=180	N%	N %
From within Gondar Town	35 (20%)	45 (25%)
From Neighboring woredas	145 (80%)	155 (75%)
Total	180(100%)	180(100%)

8.2 waiting time at different service areas

There was a significant decrease in waiting time of new ANC clients .The median waiting and service time of new visitors to see physician at ANC clinic was reduced from 286 minutes (IQR102 minutes and 424 minutes) before intervention to 248 minutes (IQR 70minutes and 248minutes) after intervention (13.3% decrease, P value = 0.002).

The other service showed significant decrease in waiting time was ;waiting and service time for screening of new clients, it decreased from 74 minutes before intervention to 54 minutes after intervention (24% decrease, P value = 0.004).

Percentage of Laboratory turnaround time reduced from 261minute in the pre intervention phase to 177 minute in the post intervention by (32% P value 1.087).

Before the intervention, clients were spending for screening a median waiting time of 63 minutes at the facility for screening by a midwife. However, after the intervention implemented, now clients spending a median waiting time of 56 minute. (See table 6).

Table 6 Comparison of Current and Previous ANC clients' total waiting time to see physician at UOGCSH 2016

Waiting and service time in (minuets)	Pre intervention		Post intervention			
	Median	IQR (25 th and 75 th)	Median	IQR (25 th and 75 th)	change	P Value
new clients screened	63	18 and 95	56	34 and 70	-11%	0.004
New client laboratory service (LTAT)	261	218 and 301	177	120 and 229	-32 %	1.087e-10
New clients Total wait time to see physician	424	376 and 467	349	330 and 375	-18 %	0.0028
Revisit clients Total wait time to see physician	103	72 and 144	74	55 and 106	-27 %	0. 0014
All clients Total wait time to see physician	286	102 and 424	248	70 and 348	13%	0.00265*

Significant at P value = 0.05. IQR: inter quartile range at the 25th and 75th percentile

9 Discussion

This study found that the intervention has reduced the total median waiting time from 286 minute to 248 minutes approximately to 4 hours. These findings were consistent with a similar study done in Mulago hospital Uganda (Conrad, 2013) which found that on average, waiting time for a patient to obtain treatment from a doctor is 346 minutes 4 to 5 hours.

In line with this, different studies have shown reduction of waiting time after introduction of simple intervention(implementing an Appointment System) at Gondar University Teaching Hospital ART department reduced the total median waiting time from 274.8 minutes before intervention to 165 minutes after intervention (Asmamaw, 2013)

On the other hand, Even though relatively the median waiting time to see physician found in this study was reduced, it is considered as higher than the recommendation of Ethiopian hospital reform implementation guide manual and the studies done in outpatient department of different hospitals of outpatient department of Ethiopia. This difference might be due to the fact that the requirement of routine laboratory service for all new ANC clients and UN like to the outpatient services in other departments at this clinic laboratory services are processed before the clients seen by the physician. The study was done only on one special clinic of the hospital (ANC clinic).

The main bottlenecks for reducing client waiting time were high client load. This is because district Hospitals and health centers are not equipped with medical equipments like Ultrasound , to fill this gap there is an agreement between UOGCSH hospital and District level institutions. Implementing these agreements will have a major roll for waiting time reduction at ANC clinic.

10 LIMITATIONS

Even though all clients and setting before and after the intervention had similarity possible confounding variables were not controlled.

11 Conclusions and Recommendation

This study results in significant reduction of waiting time for majority of ANC clients Because of the implementation of specific scheduling system at the ANC Clinic.

The intervention simply requires commitment between health departments and health institutions. Continuous integrated work is required at each level.

FMOH and REGIONAL health bureau

Facilitating establishment of formal referral system in between health facilities.

Town and zonal health department responsibilities

- Monitoring ANC client referral system between district hospital, health center and UOGCSH

UOGCSH responsibilities

Strengthening communication with district hospitals and health centers

Recruiting and Assigning medical doctors at ANC clinic to work as hospital staffs.

UOGCSH ANC clinic

Requesting GP for ANC clinic

Establishing ANC clinic side lab

UOGCSH laboratory department

Delivering laboratory results as soon as the results are avail.

Establishing ANC clinic side lab

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13 Annex

13.1 Annex 1 Declaration

I, the undersigned, senior MHA student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Public Health/Master of sciences.

Name: Kedir Ahmed

Signature: _____

Place of submission: Institute of Public Health, College of Medicine and Health Sciences,
University of Gondar.

Date of Submission: 08 / 06/ 2017

This thesis work has been submitted for examination with my/our approval as university advisor(s).

Advisors

Name	Signature
1. Professor Yigzaw Kebede	_____
2. _____	_____

Annex 2 consent forms

Introduction:

Good Morning/ afternoon Sir/Madam. My name is kedir Ahmed I am a student from Gondar University School of Public Health. We are conducting a study to measure the duration of waiting time you are waiting. The objective of this study is to reduce antenatal care visiting mothers waiting time. You will have a card for identification purposes and followed from entry up to you see the physician research assistants will record as you go through the assessment process.

This study will be used only for the purpose of reducing client delays and will also be used by hospital administration to identify the bottlenecks and implement appropriate interventions in the services delivery.

All the observations obtained from the study will remain confidential and only accessed by the principal investigator. Your name will not be recorded anywhere during the study.

Respondent's signature: _____ Date: ____ / ____ / ____ study or report findings

Annex 3 የስምምነት ፎርም በ አማረኛ

እንደምን ዋሉ/አደሩ እኔ በጎንደር ዩኒቨርሲቲ ህክምና ና ጤና ሳይንስ ኮሌጅ በበሊክ ክፍል የድህረ ምረቃ ተማሪ ከሆን በቅድመ ወሊድ ክፍል አገልግሎት ቆይታ ላይ ጥናት እያካሄድኩኝ እገኛለሁ ዓላማው የቅድመ ወሊድ ክትትል የአገልግሎት ቆይታ ሰዓትን ለማሻሻል ነው። ስለሆነም ጥናቱ ትልቅ አስተዋጽኦ ስለሚኖረው በጥናቱ ሊይ እንዲሳተፉ በትህትና እጠይቃለሁኝ።

በዚህ ጥናት ላይ መሳተፍ ምንም አይነት የሚሰጥዎት ጥቅመቀጥቅም ሆነ ገንዘብ አይኖርም። እነዲሁም ከሚያገኙት እንክብካቤ ምንም የማይቀንስ መሆኑን መግለጽ እወዳለሁ።

በጥናቱ ላይ መሳተፍ ፈቃደኛ ነዎት? 1.አዎ 2 አይደለሁም

በጥናቱ ስለተሳተፉ በቅድሚያ አመሰግናለሁኝ ።

የተሳታፊ ፊርማ : _____ ቀን: ____ / ____ / ____

Annex 4 ANC client general information and waiting time survey format

Date -----

New -----

Part 1	General information
	Name MRN no = Age = completed by assistant no .1 Woreda or kebele -----
Part 2	ANC clients waiting time
2.1	Registration completed time= completed by assistant no .1
2.2	Screening start time= completed by assistant no .2
2.3	Laboratory sent time = completed by assistant no .2
2.4	lab result avail time= completed by assistant no .2
2.5	Examination start time = completed by assistant no .(4,5,6)
2.6	Time to see physician = completed by assistant no .(4,5,6)
2.7	Time consultation completed= completed by assistant no .(4,5,6)
2.8	Examination room number= 1 ,2 .3 ,4

AB=absents LAB NA=lab result not available NS= not screened

Annex 5 Repeat ANC client general information and waiting time survey format

Date

Repeat

Part 1	ANC client general information
	Name
	MRN no =
	Age = completed by assistant no .3
	Woreda or kebeles -----
Part 2	ANC clients waiting time
2.1	Registration completed time= completed by assistant no .3
2.2	Examination start time = completed by assistant no .(4,5,6)
2.3	Time to see physician = completed by assistant no .(4,5,6)
2.4	Time consultation completed= completed by assistant no .(4,5,6)
2.5	Examination room number= 2 .3 ,4

Date ----- Repeat -----

1	ANC client general information
	Name
	MRN no =
	Age = completed by assistant no .3
	Woreda or kebele -----
Part 2	ANC clients waiting time
2.1	Registration completed time= completed by assistant no .3
2.2	Examination start time = completed by assistant no .(4,5,6)
2.3	Time to see physician = completed by assistant no .(4,5,6)
2.4	Time consultation completed= completed by assistant no .(4,5,6)
2.5	Examination room number= ,2 ,3 ,4

Annex 8 የኑበሰጡር እናቶች አጠቃላይ መረጃ እና የቆይታ ጊዜ መከታተያ በ አማረኛ

ቀን----- ደጋማ -----

1	አጠቃላይ መረጃ
	<p>ስም-----</p> <p>ካርድ ቁጥር = ----- እረዳት .3 የሚሞላው</p> <p>እድሜ = ----- ወረዳ ወይም ቀበሌ -----</p>
2	የኅብሰጡር እናቶች ክትትል የቆይታ ጊዜ
2.1	ምዝገባ የ ጨረሰብት ሰዓት = = እረዳት ቁ 3 የሚሞላው
2.2	ምርመራ የጀመሩበት ሰዓት = = እረዳት ቁ 4፣5፣6 የሚሞሉት
2.3	ወደ አልትራሳውንድ የተላኩበት ሰዓት = እረዳት ቁ 4፣5፣6 የሚሞሉት
2.4	ምርመራ የጨረሰብት ሰዓት = እረዳት ቁ 4፣5 ፣6 የሚሞሉት
2.5	ምርመራ ክፍል = 2, 3, 4